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OIL INTAKE SCREENING DEVICE FOR INTERNAL COMBUSTION ENGINES

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Fig.1

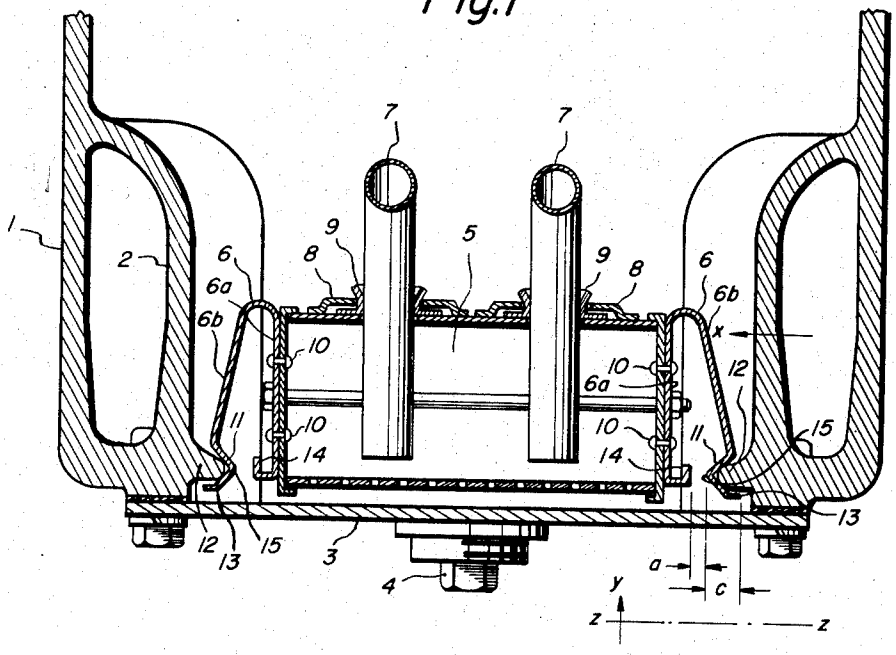
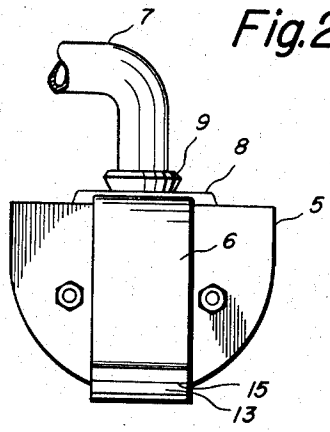


Fig.2



INVENTORS

ALFRED SCHLEICHER
KARL FLEISCHMANN

BY Taulmin & Taulmin

ATTORNEYS

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OIL INTAKE SCREENING DEVICE FOR INTERNAL COMBUSTION ENGINES

Alfred Schleicher, Spalt, and Karl Fleischmann, Nurnberg, Germany, assignors to M.A.N. Maschinenfabrik Augsburg-Nuernberg, A.G., Nurnberg, Germany

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2 Claims. (Cl. 210—171)

This invention relates to a screening device, and in particular to a screening device for screening the lubricating oil for an internal combustion engine. More particularly still this invention is concerned with a novel form of a screening device of this nature and a novel manner of securing the device in position in the engine.

Most internal combustion engines are provided with screens pertaining to the inlet side of the oil pump which circulates the lubricating fluid within the engine. In a great many vehicles the engine block carries no load, as is the case with most passenger and truck vehicles, and the oil sump is thus thin-walled and carries no load and therefore can be made recessed and, when removed, provides ready access to the interior of the crankcase of the engine.

In certain other cases, however, the crankcase of the engine may form an important supporting frame member and is therefore subjected to considerable load; this being the case in a great many tractors, and when the engine crankcase has this function the oil sump is generally located in such a position that it is provided only with a flat cover plate.

The engine crankcase, in an arrangement of this nature, is bolted to the transmission of the tractor and cannot readily be separated therefrom. Access to the interior of a crankcase of this nature is more difficult since it can only be accomplished through a flat sheet metal lid.

In the case of tractors as referred to above, or in the case of any crankcase arrangement where the crankcase extends downwardly and is lowered by a flat lid, the screening device pertaining to the inlet side of the oil pump is troublesome to install and to remove for servicing.

The screening device may be secured to the lower lid of the oil sump of the crankcase and the pipe, or pipes, leading to the pump loosely introduced therein, but this arrangement requires complicated expensive mounting and the device is difficult to assemble and repair, especially where the engine is of such a size or nature that several screening devices are provided and the time required to effect installation of the covering lid for the sump becomes considerable on account of the aligning up of the pipes with the screening devices.

It has been proposed in a case of this nature to provide known adjustable funnel elements to assist in introducing the pump pipes into the screening devices, but even with this assistance the problem still exists of aligning the pipes with the devices and then securing the lid in place while supporting thereon the added weight of the screening devices.

It has also been proposed to secure the oil intake screening device directly to the pipes as by clamping, bolting or welding these elements together. While this permits relatively simple initial assembling of the engine it will be evident that repair work is considerably complex, and that the re-assembling of the screening device with the pump pipes in such an arrangement would be quite difficult.

Having the foregoing in mind, the present invention has as a primary object the provision of a screening device for an internal combustion engine, particularly of the

type referred to which has a flat cover for the oil sump, that eliminates the difficulties referred to above.

A particular object of the present invention is the provision of an oil screening device for an internal combustion engine which is resiliently supported in position whereby it can readily be installed or removed at any time.

A further object of the present invention is the provision of a readily detachable oil screening device for an internal combustion engine which is located in the crankcase of the engine, which is positively prevented from becoming dislodged and therefore from causing damage to the moving parts of the engine within the crankcase.

A still further object of the present invention is the provision of an oil screening device for an internal combustion engine which can be readily and easily snapped into position, but in which there is no chance that the device can be improperly installed by a careless workman.

It is also an object of the present invention to provide an oil screening device for an internal combustion engine which is detachably supported within the crankcase without imposing any load upon the oil intake pipes themselves.

These and other objects and advantages of this invention will become more apparent upon reference to the following specification taken in connection with the accompanying drawings, wherein:

Figure 1 is a sectional view through the lower part of the crankcase of an internal combustion engine of the nature referred to showing an oil intake screening device mounted therein by the novel supporting structure according to the present invention; and

Figure 2 is a view looking in toward the end of the oil screening device as indicated by the arrow X in Figure 1.

Referring to the drawings somewhat more in detail, the engine, the conventional parts of which are not illustrated, has a crankcase **1** defining an oil sump having inner wall means **2**, and which sump opens toward the bottom and is closed by a lid **3** having a conventional oil drain plug **4**. The oil screening device with which the present invention is particularly concerned is generally designated by reference numeral **5**, and this screening device is generally in the form of a basket into which the intake pipes leading to the oil pump or pumps extend so that all oil flowing into the pipes must pass through the screening device.

In general, the screening device comprises a top member and an arcuate screen member forming the bottom and sides and end caps retaining the top and screen member in assembled relation, and which end caps are held together by through bolts.

The top member is provided with apertures for receiving the oil intake pipes **7**, and these apertures are larger than the pipes to permit some degree of mis-alignment of the pipes. Pertaining to each aperture is a funnel-shaped element **9** extending outwardly at the top and which is movably retained in place relative to its pertaining aperture by a guide ring **8**. The arrangement permits the pipes **7** to extend sealingly through the top wall of the screening device, but does not require absolutely accurate alignment thereof with the apertures therein.

According to the present invention there are provided resilient spring means for releasably retaining the screening device **5** in position within the oil sump. In the modification illustrated the resilient spring means take the form of the U-shaped springs **6** attached to the end caps of the screening device as by the rivets **10**.

Each spring **6** has, in addition to the U-shaped leg *6a*, a downwardly and outwardly extending leg *6b* which, at its lower end, is provided with an indented portion **11** forming a groove for receiving the bead or projection **12** along the walls **2** of the oil sump. The springs **6**, as will

be seen in Figure 1, taper inwardly toward the top of the screening device so that the projections or beads 12 will snap into the recess 11 when the screening device is positioned upwardly into the crankcase.

It is extremely important that the screening device be installed in such a manner that it cannot become dislodged by vibration or be improperly set in position at the time of installation and, according to the present invention, this is accomplished by bending the free end 13 of each of the springs 6 outwardly to extend beneath the pertaining bead or projection 12 a predetermined distance.

Further, the lower end of each leg 6*a* of the springs 6 is formed over to provide an abutment 14 adapted for engaging the rearmost point 15 of the recess 11 of the other leg of the pertaining spring to limit the inward movement of the leg 6*b*.

As will be seen toward the right side of Figure 1, the point 15 of each leg 6*b* of the springs 6 can move a distance indicated at *a*, whereas it is necessary for the turned over ends 13 to move the distance indicated at *c* before these turned over ends will pass the beads 12. In this manner the screening device is absolutely prevented from being pushed into the oil sump beyond the beads 12 or from becoming accidentally dislodged therefrom during operation of the engine.

It will also be evident that the turned over ends 13 are so disposed that they are located closely adjacent the upper surface of lid 3 so that the screening device is also prevented from dropping downwardly from its proper position during operation of the engine and, if improperly located at the time of installation, will be pushed into the proper position as soon as the lid 3 is put in place.

It will be evident that the pipes 7 prevent shifting of the screening device in a horizontal direction while the springs 6 prevent shifting of the screening device in a vertical direction as well as in a horizontal direction, and the screening device is thus positively held in position within the oil sump at all times, while at the same time it is very easy to install and remove.

It will be evident that removing of the oil sump can readily be accomplished by pressing inwardly on the turned over ends 13 of the springs 6 and then pulling downwardly on the device.

It will be understood that the particular screening arrangement illustrated is not the only resilient releasable supporting arrangement that could be utilized in the practice of the present invention. The springs could, for example, be so formed as to engage the recesses in the walls of the oil sump, or projections for engaging the springs could be provided in the form of screws or rivet heads fixed to the side walls of the oil sump.

In any case, all of the advantages of the present invention will be had and special machining of the oil sump is eliminated and special supporting of the pump pipes is also eliminated. Such expensive fittings for supporting the oil sump on the pump pipes are eliminated and, likewise, the cover for closing the opening in the oil sump is free of any regions provided for securing the screening device thereto, and which regions might lead to oil leaks.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions, and accordingly it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

We claim:

1. In an internal combustion engine, a crankcase having downwardly depending walls defining an oil sump, projections on said side walls, an oil intake pipe extending into said oil sump, an oil screen comprising a top wall having an aperture to receive said oil pipe and a perforated wall forming a screen, funnel-shaped sealing means movably supported on the top wall of said oil screen in alignment with said aperture for sealingly receiving said oil pipe, a retaining ring on said top wall holding said funnel-shaped sealing element in position but permitting lateral movement thereof in all directions, resilient spring elements on opposite sides of said oil screen for releasably engaging said side wall projections to detachably receive said oil screen in said oil sump, means on said spring elements for preventing movement of said oil screen into said oil sump when said spring elements are detached from said projections, and a flat cover independent of said oil screen for closing said oil sump so that said cover can be removed from said oil sump without disturbing said oil screen.

2. In an internal combustion engine, a crankcase having downwardly depending walls defining an oil sump having an opening in the bottom thereof, projections on said side walls adjacent said opening, an oil intake pipe extending into said oil sump, an oil screen comprising a top wall having an aperture to receive said oil pipe and a perforated wall forming a screen, funnel-shaped sealing means movably supported on the top wall of said oil screen in alignment with said aperture for sealingly receiving said oil pipe, a retaining ring on said top wall holding said funnel-shaped sealing element in position but permitting lateral movement thereof in all directions, resilient spring elements on opposite sides of said oil screen and each having an outwardly opening recess therein in that portion of the element positioned in the lowermost portion of the perforated wall, the portion of each spring element forming the lower part of said recess engaging at all times the side of said projections adjacent said sump opening so that movement of the oil screen into said oil sump is prevented, and a flat cover independent of said oil screen closing said oil sump opening so that said cover can be removed from said oil sump without disturbing said oil screen, the distance between said projections and said flat cover being such that said spring element lower portions forming the recess will contact said flat cover upon movement of said oil screen outwardly of said sump whereby said flat cover will retain said oil screen resilient spring elements in engagement with said side wall projections.

References Cited in the file of this patent

UNITED STATES PATENTS

1,959,096	Fernberg	May 15, 1934
2,392,656	Foster	Jan. 8, 1946
2,437,008	Van Doehren	Mar. 2, 1948